■ Enforcement regulation of Ballast Water Management Act [Form #13] Certificate No: HDOBW-0008-15

Test Certificate for Type Approval

Applicant	company name	HANLA IMS CO.,LTD.
	Representative	Ji Seok Jun, Kim Yeong Gu
	corporate registration number	606-81-57969
	Address	115, 1-Hwajeon Sandanro, Gangseo-Gu, Busan, Republic of Korea
Manufacturer	company name	HANLA IMS CO.,LTD.
	Address	115, 1-Hwajeon Sandanro, Gangseo-Gu, Busan, Republic of Korea
Type and model		- Type: EcoGuardian™ System (Fitler + Electrolyzer) Non Explosion-Proof Type & Explosion-Proof Type - Model: EG0130-(Ex), EG0250-(Ex), EG0350-(Ex), EG0500-(Ex), EG0800-(Ex), EG1000-(Ex), EG1500-(Ex), EG2000-(Ex), EG2600-(Ex), EG3000-(Ex), EG4000-(Ex), EG6000-(Ex)
Treatment rated capacity		130, 250, 350, 500, 800, 1000, 1500, 2000, 2600, 3000, 4000, 6000 m3/h
date of manufacture and serial no. of the product		- Filter(AFU): AFU0250A2-130001 / 17th January, 2013 - Electrolyzer(ECU): ECU0250A1-140001 / 9th April, 2014 - Rectifier(PSE): R1300001 / January 2013 - Control Panel(MCP): MCP0250A1-14001 / 9th April, 2014
kind of approval test		Conformity Test

This is to certified that the EcoGuardian™ System is satisfied in accordance with article 17 in 「Ballast Water Management Act」 by Ministry of Oceans & Fisheries and Guideline G8(resolution MEPC.174(58)) of BWM Convention 2004.

1st April, 2015

President of Korean Register

TEST REPORT

1. Applicant

Name : HANLA IMS Co., Ltd

Address : 115, 1-Hwajeon Sandaro, Gangseo-Gu, Busan, Republic of Korea

2. Products

Name : Ballast Water Management System

Type : EcoGuardian™ System (Filter + Electrolyzer)
including non explosion-proof type and explosion-proof type

Model : EG0130-(Ex), EG0250-(Ex), EG0350-(Ex), EG0500-(Ex), EG0800-(Ex), EG1000-(Ex), EG1500-(Ex), EG2000-(Ex), EG2600-(Ex), EG3000-(Ex), EG4000-(Ex), EG6000-(Ex)

Manufacturer : Same as applicant

3. Test Standard/Method : Appendix 2 of The Provisional Regulation for type Approval of Ballast Water Management System by Ministry of Oceans and Fisheries (PR No.2013-56)

4. Test Results : Satisfied

5. Use of Report : Conformity Test for Type Approval

6. Date of Application : July 10, 2014

7. Date of Issue : April 1, 2015

Tested by

Kim Woong-tae/Byun Jung-keaun
Marine & Ocean Equipment Team

Approved by

Choi Jong-yuel
Marine & Ocean Equipment Team

The test results contained apply only to the test sample(s) supplied by the applicant, and this test report shall not be reproduced in full or in part prior to the approval of Korean Register.

8. Description

1) This approval is granted on the basis of the conformity test of EG0250(250 m^3/h), has been carried out on 19th to 22th January 2015, with the additional documents submitted by the applicant.
2) In order to install a component of ballast water management on weather deck of vessel, the component shall be proved to satisfy IP grade level requested by Rules and Guidances for the Classification of Steel Ships or equivalent standard.
3) The manufacturer should inform this Society of all kinds of revisions of the softwares. If the changes are recognized to affect functionality of the approved system, appropriate tests to confirm the reliability of the revised software may be performed in the presence of our surveyor.
4) In case of using plastic pipes, fittings and/or electrolyzers, materials shall be tested to prove the appropriateness of fire resistance and other conditions according to Rules and Guidances for the Classification of Steel Ships or equivalent standard.
5) In case of using flexible hoses, the hoses shall be tested to prove the appropriateness of fire resistance and other conditions according to Rules and Guidances for the Classification of Steel Ships or equivalent standard.
6) The piping line to vent H_2 gas shall be gas-tight designed and constructed and leaded to safety zone on weather deck.
7) Location of H_2 sensor(s) in the ballast water management system for each vessel shall be decided with a consideration in order to detect the concentration of H_2. The length between the H_2 detector and blower in the pipeline shall be minimized and decided according to applicant (manufacturer) limitation.
8) Initial injection rate of the neutralizer solution shall be 2.5 times as much as the theoretical value for neutralizing 9 mg/L TRO as Cl_2 for 3 minutes during de-ballasting after the ballast pump starts to run.
9) After ballasting mode and/or de-ballasting mode of ballast water management system stops, the system shall be kept for 10 minutes in standby condition before each mode change-over.
10) Ballasting pump and ballast water management system shall be operated dependently.

9. Summary of Test Results

No.	Test Items	Results
1	1. 1) of Appendix 2 of PR 2013-56	Satisfied
2	1. 2) of Appendix 2 of PR 2013-56	Satisfied
3	1. 3) of Appendix 2 of PR 2013-56	Satisfied
4	1. 4). (1) of Appendix 2 of PR 2013-56	Satisfied

5	1. 4). (2) of Appendix 2 of PR 2013-56	Satisfied
6	1. 4). (3) of Appendix 2 of PR 2013-56	Satisfied
7	1. 4). (4) of Appendix 2 of PR 2013-56	Satisfied
8	1. 5). of Appendix 2 of PR 2013-56	Satisfied
9	2. 1). (1) of Appendix 2 of PR 2013-56	Satisfied
10	2. 1). (2) of Appendix 2 of PR 2013-56	Satisfied
11	2. 1). (3) of Appendix 2 of PR 2013-56	Satisfied
12	2. 1). (4) of Appendix 2 of PR 2013-56	Satisfied
13	2. 1). (5) of Appendix 2 of PR 2013-56	Satisfied
14	2. 2) of Appendix 2 of PR 2013-56	Satisfied
15	2. 3). (1) of Appendix 2 of PR 2013-56	Satisfied
16	2. 3). (2) of Appendix 2 of PR 2013-56	Satisfied
17	3. 1) of Appendix 2 of PR 2013-56	Satisfied
18	3. 2) of Appendix 2 of PR 2013-56	Satisfied
19	3. 3) of Appendix 2 of PR 2013-56	Satisfied
20	3. 4). (1) of Appendix 2 of PR 2013-56	Satisfied
21	3. 4). (2) of Appendix 2 of PR 2013-56	Satisfied
22	3. 4). (3) of Appendix 2 of PR 2013-56	Satisfied
23	3. 5) of Appendix 2 of PR 2013-56	Satisfied
24	4. of Appendix 2 of PR 2013-56	Satisfied

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[Appendix 2] of PR 2013-56

No.	Test Items	Guideline (G8)
1	1. 1) The BWMS should not contain or use any substance of a dangerous nature, unless adequate arrangements for storage, application, mitigation, and safe handling, acceptable to the Administration, are provided to mitigate any hazards introduced thereby.	[4.2]
2	1. 2) In case of any failure compromising the proper operation of the BWMS, audible and visual alarm signals should be given in all stations from which ballast water operations are controlled.	[4.3]
3	1. 3) All working parts of the BWMS that are liable to wear or to be damaged should be easily accessible for maintenance. The routine maintenance of the BWMS and troubleshooting procedures should be clearly defined by the manufacturer in the operating and maintenance manual. All maintenance and repairs should be recorded.	[4.4]
4	1. 4) To avoid interference with the BWMS, the following items should be included : (1) every access of the BWMS beyond the essential requirements of paragraph 1.3) should require the breaking of a seal;	[4.5.1]
5	(2) if applicable, the BWMS should be so constructed that a visual alarm is always activated whenever the BWMS is in operation for purposes of cleaning, calibration, or repair, and these events should be recorded by the control equipment;	[4.5.2]
6	(3) in the event of an emergency, suitable by-passes or overrides to protect the safety of the ship and personnel should be installed; and	[4.5.3]
7	(4) any bypass of the BWMS should activate an alarm, and the bypass event should be recorded by the Control Equipment.	[4.5.4]
8	1. 5) Facilities should be provided for checking, at the renewal surveys and according to the manufacturer's instructions, the performance of the BWMS components that take measurements. A calibration certificate certifying the date of the last calibration check, should be retained on board for inspection purposes.	[4.6]

No.	Test Items	Guideline (G8)
9	2. 1) (1) The ballast water treatment equipment should be robust and suitable for working in the shipboard environment,	[4.7]
10	(2) should be of a design and construction adequate for the service for which it is intended	[4.7]
11	(3) and should be so installed and protected as to reduce to a minimum any danger to persons on board,	[4.7]
12	(4) due regard being paid to hot surfaces and other hazards.	[4.7]
13	(5) The design should have regard to materials used in construction, the purpose for which the equipment is intended, the working conditions to which it will be subjected and the environmental conditions on board.	[4.7]
14	2. 2) The ballast water treatment equipment should be provided with simple and effective means for its operation and control. It should be provided with a control system that should be such that the services needed for the proper operation of the ballast water treatment equipment are ensured through the necessary automatic arrangements.	[4.8]
15	2. 3) The ballast water treatment equipment should, if intended to be fitted in locations where flammable atmospheres may be present, (1) comply with the relevant safety regulations for such spaces.	[4.9]
16	(2) Any electrical equipment that is part of the BWMS should be based in a non-hazardous area, or should be certified by the Administration as safe for use in a hazardous area. Any moving parts, which are fitted in hazardous areas, should be arranged so as to avoid the formation of static electricity.	[4.9]
17	3. 1) The BWMS should incorporate control equipment that automatically monitors and adjusts necessary treatment dosages or intensities or other aspects of the BWMS of the vessel, which while not directly effecting treatment, are nonetheless required for proper administration of the necessary treatment.	[4.10]
18	3. 2) The control equipment should incorporate a continuous self-monitoring function during the period in which the BWMS is in operation.	[4.11]

No.	Test Items	Guideline (G8)
19	3. 3) The monitoring equipment should record the proper functioning or failure of the BWMS.	[4.12]
20	3. 4) (1) To facilitate compliance with regulation B-2, the control equipment should also be able to store data for at least 24 months,	[4.13]
21	(2) and should be able to display or print a record for official inspections as required.	[4.13]
22	(3) In the event the control equipment is replaced, means should be provided to ensure the data recorded prior to replacement remains available on board for 24 months.	[4.13]
23	3.5) It is recommended that simple means be provided aboard ship to check on drift by measuring devices that are part of the control equipment, repeatability of the control equipment devices, and the ability to re-zero the control equipment meters.	[4.14]
24	4. Explosion proof Explosion-proof equipments must pass the environmental test. Installation and operation will not to cause fires and explosions	[4.9]